

Helping Women Quit Smoking: Results of a Community Intervention Program

ABSTRACT

Objectives. This intervention was implemented to reduce the prevalence of cigarette smoking among women.

Methods. We used community organization approaches to create coalitions and task forces to develop and implement a multicomponent intervention in 2 counties in Vermont and New Hampshire, with a special focus on providing support to help women quit smoking. Evaluation was by preintervention and postintervention random-digit-dialed telephone surveys in the intervention counties and the 2 matched comparison counties.

Results. In the intervention counties, compared with the comparison counties, the odds of a woman being a smoker after 4 years of program activities were 0.88 (95% confidence interval=0.78, 1.00) ($P=.02$, 1-tailed); women smokers' perceptions of community norms about women smoking were significantly more negative ($P=.002$, 1-tailed); and the quit rate in the past 5 years was significantly greater (25.4% vs 21.4%; $P=.02$, 1-tailed). Quit rates were significantly higher in the intervention counties among younger women (aged 18 to 44 years); among women with household annual incomes of \$25 000 or less; and among heavier smokers (those who smoked 25 or more cigarettes daily).

Conclusions. In these rural counties, community participation in planning and implementing interventions was accompanied by favorable changes in women's smoking behavior. (*Am J Public Health.* 2000;90:940-946)

Roger H. Secker-Walker, MB, FRCP, Brian S. Flynn, ScD, Laura J. Solomon, PhD, Joan M. Skelly, MS, Anne L. Dorwaldt, MA, and Takamaru Ashikaga, PhD

Since 1972, several multicomponent, community-based programs have been conducted to reduce cardiovascular risk factors, including cigarette smoking. In earlier trials, such as the North Karelia Project,¹ the Stanford Three-City Project,² and the Swiss National Research Program,³ cigarette consumption or the prevalence of smoking was reduced. In more recent trials, such as the Stanford Five-City Project,⁴ the Minnesota Heart Health Program,⁵ the Pawtucket Heart Health Program,⁶ and the Heart to Heart Project,⁷ results were mixed, with some showing intervention effects on smoking behavior^{4,5} but not others.^{6,7}

Several community trials have specifically addressed smoking. The North Coast "Quit for Life" program in Australia was accompanied by significant declines in the prevalence of smoking in both the town receiving only the media campaign and the town receiving the media campaign plus a community program.⁸ Declines were more sustained over time in the latter town. The Community Intervention Trial for Smoking Cessation (COMMIT) study showed no effect on smoking in cross-sectional analyses beyond favorable secular trends.⁹ However, cohort analyses showed a significantly greater quit rate for light to moderate smokers than for heavy smokers.¹⁰ The Neighbors for a Smoke Free North Side study showed a significant reduction in smoking prevalence, especially among women, after 2 years of grassroots community organization and intervention.¹¹

In the mid-1980s, the decline in smoking prevalence among US women was lagging behind that of men.¹² The paucity of research on strategies to accomplish large-scale smoking cessation among women at that time, and women's needs for social support while quitting, their need for assistance with coping with negative affect in the absence of smoking, and their concerns about

weight gain following quitting,^{13,14} led us to focus this project exclusively on women smokers. Assessing community capacity and involving community members in the planning and implementation of community-based interventions by tailoring what is done to the needs and abilities of the community are thought to be important factors in improving the chances of success of such interventions.¹⁵⁻¹⁷ The Community Coalitions to Help Women Quit Smoking project used participatory community organization to plan and provide widespread support to women smokers as they tried to change their smoking behavior.¹⁶ In this article, we describe the results of this community intervention trial, which took place between 1989 and 1994.

Methods

The goal of this project was to reduce the prevalence of smoking among women aged 18 to 64 years, with special emphasis on lower-income women of childbearing age, among whom smoking was most prevalent. The intervention objectives were to increase

All authors are with the University of Vermont, Burlington. Roger H. Secker-Walker, Brian S. Flynn, and Anne L. Dorwaldt are with the Office of Health Promotion Research; Brian S. Flynn is also with the Department of Family Practice. Laura J. Solomon is with the Department of Psychology. Joan M. Skelly and Takamaru Ashikaga are with the Department of Medical Biostatistics. Roger H. Secker-Walker, Brian S. Flynn, Laura J. Solomon, and Takamaru Ashikaga are also with the Vermont Cancer Center.

Requests for reprints should be sent to Roger H. Secker-Walker, MB, FRCP, 1 S Prospect St, Burlington, VT 05401 (e-mail: rseckerw@zoo.uvm.edu).

This article was accepted December 10, 1999.

motivation and intention to quit smoking and confidence in “staying quit” despite weight gain and negative affect; to increase awareness of, access to, and use of cessation activities or support for staying quit; and to strengthen perceived norms and available support to help women quit smoking. We conceived the achievement of these objectives in a community setting through community members’ participation in planning and implementation.¹⁶

We used social cognitive theory,¹⁸ the transtheoretical model of behavior change,¹⁹ diffusion of innovation theory,²⁰ and communications theory²¹ to guide the content, approach, and reach of the intervention. We used the PRECEDE framework of predisposing factors (attitudes, beliefs), enabling factors (skills, barriers), and reinforcing factors (social support, norms) involved in behavior change to integrate the overall objectives of the intervention program with the evaluation plan.²²

The design was nonrandomized with 2 pairs of demographically matched counties assessed preintervention and postintervention. Two counties in Vermont and 2 in New Hampshire were selected through a systematic process to ensure demographic similarity based on data from the 1980 US census. One county in each state was adjacent to the other. These were designated the intervention counties, giving geographic separation of mass media markets between conditions. In 1990, the total population of the intervention counties, Windham County, Vt, and Cheshire County, NH, was 111 709 (41 588 and 70 121), of whom 35 382 (12 904 and 22 478) were women aged 18 to 64 years. The total population of the comparison counties, Rutland County, Vt, and Belknap County, NH, was 111 357 (62 141 and 49 216), of whom 34 480 (19 473 and 15 007) were women aged 18 to 64 years.

Intervention

Community organization. We conducted interviews with key informants in each intervention county to identify community members who supported the goals of this project. Offices were then set up in each intervention county staffed by a community coordinator, a health educator, and a staff assistant recruited from these counties. Each community coordinator formed a local planning group, and the program was named “Breathe Easy.” Each county’s planning group formed a coalition, and each coalition recruited volunteers to serve on 5 working groups: support systems, health professionals, educators, worksites, and mass media. One coalition consolidated these working

groups into 3—support services, communications, and advocacy—the following year.

Planning. The project investigators prepared an outline of suggested activities for these working groups, and each planning group reviewed it. With local modifications, these activities were subsequently adopted as each county’s first annual plan. The second year’s annual plans were drawn up by each coalition, with less input from the investigators. The third and fourth years of annual plans were devised almost entirely by each coalition, with very little input from the investigators.

Each annual plan included specific measurable objectives for each working group to be accomplished or initiated during the following 12 months. During the first 3 intervention years, 67 of 78 (86%), 107 of 127 (84%), and 80 of 85 (94%), respectively, of these objectives in one county and 62 of 79 (78%), 122 of 134 (91%), and 73 of 95 (77%) in the other were either accomplished or ongoing at the end of each year. During the fourth year, the annual plans contained 32 and 21 objectives, respectively, which were either completed or ongoing at the time that planned withdrawal of external support for the community offices took place. The last 2 annual plans in each county included strategies to institutionalize the Breathe Easy programs, which became legally incorporated not-for-profit organizations in their respective states during the fourth year. Details of these annual plans are available on request.

Activities. Support systems to help women quit smoking were developed in the first year and included individual proactive telephone peer support, in which trained volunteer female ex-smokers provided support to women by telephone during their efforts to quit,²³ and support groups for women who had quit, which were led by trained volunteer facilitators. During the second year, a 29-minute videotape showing 4 young Vermont women going through the process of quitting smoking was produced and widely distributed through health professionals’ offices and video outlets at no cost.^{24,25} In the third year, free smoking cessation classes, with a focus on dealing with negative affect, were organized on a monthly basis.

Primary care physicians and, later, dentists and dental hygienists were introduced to the Breathe Easy resources for quitting smoking available to their female patients and were encouraged to help them set quit dates and make referrals to the telephone peer support system, cessation classes, and support groups. Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) public health nurses and family planning counselors were trained in a brief

smoking cessation protocol and use of the Breathe Easy referral systems for their clients. Participating health professionals received regular feedback on how the support systems were working and were given referral forms and self-help materials as needed.²⁶

Presentations were made, self-help materials were offered, and the availability of Breathe Easy resources was described to community college, technical, and high school health educators and adult basic education professionals. Workplace initiatives included presentations to businesses and worksites and assistance with smoking policies, cessation classes, and self-help materials. Media initiatives included newsprint and radio and, to a lesser extent, television and made use of paid advertisements, feature stories about smoking, information about the help available in each community for quitting, and profiles of local women seeking help and attempting to quit. In addition, health fairs and other public events were used to recruit volunteers and publicize the help available through Breathe Easy. A tip sheet with referral form and telephone number for Breathe Easy and pamphlets about the risks of smoking and benefits of quitting, at fifth- to sixth-grade reading level, were produced and widely distributed to health professionals’ offices, high schools, colleges, businesses, and worksites.

Evaluation and Measurement

The summative evaluation was based on random-digit-dialed telephone surveys at baseline in year 1, before program implementation, and again in year 5, immediately following the planned withdrawal of external support for the Breathe Easy community offices. The target sample size for these independent cross-sectional surveys was 6800 adult women aged 18 to 64 years. The survey instrument included demographic and smoking history items used in the COMMIT study.²⁷ The other measures we used have been described previously¹⁴ and are summarized here.

Smoking behavior. Women who reported smoking fewer than 100 cigarettes in their life were defined as nonsmokers. Those who had smoked more than this but reported no longer smoking were regarded as ex-smokers and were further categorized as recent ex-smokers if they had quit smoking within the past 5 years. Women who reported smoking an average of 1 or more cigarettes per day were defined as current smokers, and women who smoked fewer than 1 cigarette per day were defined as nonsmokers. Additional items included average daily cigarette consumption, number of serious quit attempts lasting at

least 24 hours in the past 12 months, and length of longest attempt.

Attitudes toward quitting smoking. We used items devised by Russell et al.²⁸ to assess intention and motivation to quit smoking. Measures of confidence in being able to stop smoking and confidence in being able to control weight or to handle stress, anger, or boredom after quitting smoking¹⁴ were combined into a confidence scale having a mean value between 1 and 4, with a Cronbach α of 0.68.

Perceptions of social support. Women smokers' perceptions of how helpful their partner, family, friends, community members, or health professionals would be if they quit smoking¹⁴ were combined into a social support scale having a mean value between 1 and 4, with a Cronbach α of 0.68.

Perceptions of norms. Women smokers' perceptions of how their family, friends, and other community members feel about women who smoke were each assessed on a 5-point scale, ranging from the feeling that women "definitely should not smoke" (1 point) to "it's okay to smoke as much as you want" (5 points).¹⁴

Availability of smoking cessation resources. In year 5, perceived availability of information about smoking; booklets, pamphlets, and videotapes about smoking cessation; smoking cessation groups; stay-quit support groups; individual support for quitting; and advice from doctors, nurses, and other professionals were each assessed on a 4-point scale, ranging from "probably not available" (1 point) to "very easy to get" (4 points).

Program recognition and media coverage of smoking. Items concerning recognition of the community cessation program and media coverage of smoking also were included in year 5. The media coverage items asked whether the respondent had seen, heard, or read anything about smoking during the past 6 months.

Evaluation surveys. A random-digit-dialed sampling plan, stratified by geographic area, was used to select the sample from each county with a Waksberg approach.²⁹ A computer-aided telephone interviewing system was used.³⁰ Experienced female interviewers were trained on the content of the survey instrument, computer-aided telephone interviewing procedures, subject eligibility criteria, interviewing methods, and procedures for callbacks and nonresponse. Ten percent of all interviews were regularly monitored in real time by experienced survey supervisors during randomly selected interviews.

The baseline survey was conducted from October 1989 to June 1990, and the year 5 follow-up survey was conducted

from September 1993 to April 1994. The overall sample sizes were 6379 and 6436, respectively. Up to 8 callbacks were used with evening and weekend schedules and resulted in response rates of 79.1% for the baseline survey and 89.9% for the year 5 survey of eligible households with working telephones.³¹

We used SAS statistical software for data management.³² Statistical analyses were conducted with SUDAAN,³³ with poststratification for age based on the 1990 census figures. Comparisons used the DESCRIPT, CROSSTAB, and LOGISTIC procedures, with a 5% significance level. Probability levels were 2-tailed for baseline comparisons. Because the a priori main hypothesis was that more favorable changes would be observed in the intervention counties relative to the comparison counties, a 1-tailed test of significance was used to assess differences within conditions between years 1 and 5 and between conditions in year 5.

To match the unit of analysis with that of the design, sample size estimates were based on precision estimates derived from a within-stratum cluster variance equation.³⁴ Precision estimates for smoking prevalence used a Bernoulli measure of $s^2 = 0.21$, an average cluster size of 1700, 2 clusters per study condition, and an intraclass correlation coefficient of 0.001. The overall SE of the smoking point prevalence estimate within each study condition was estimated to be 0.8%. The comparison of changes in smoking prevalence between baseline and year 5 surveys was estimated to have an SE of 1.1%. Similar SE values were expected for the comparison of smoking prevalence values for the year 5 survey, and a 2-sample *t* test with 2 degrees of freedom would have about 75% power to detect a 3.5% difference in smoking prevalence.

Results

Baseline Comparisons

At baseline, no significant differences were found between intervention and comparison conditions in the proportion of smokers, recent ex-smokers, and nonsmokers or in the years of education or income. Differences were seen in age, marital status, and proportion of employed women (Table 1). Fewer than 2.5% of the respondents in either condition were non-White.

As shown in Table 2, no significant differences were found between conditions at baseline in cigarette consumption, number of previous serious quit attempts, length of longest attempt, quit rates, recent ex-smokers' cigarette consumption in the last year they

smoked, and number of quit attempts in that last year.

Among current smokers, attitudes toward quitting and staying quit were generally similar at baseline, except that in the comparison counties, smokers tended to have higher levels of motivation to stop smoking ($P = .04$, 2-tailed; not shown). Perceptions of social support for quitting and perceived norms concerning women smoking did not differ by condition.

Smoking Prevalence

As shown in Table 2, smoking prevalence in year 5 was significantly lower in the intervention counties than in the comparison counties by 2 percentage points, a relative difference of 7.8%. Smoking prevalence also had declined significantly since baseline in the intervention counties but not in the comparison counties.

Adjustments in Smoking Prevalence for Differences in Demographics

Because age, marital status, and working for pay affect smoking prevalence,¹¹ and because each differed significantly between conditions at baseline, we used logistic regression analysis to adjust for these differences. These analyses confirmed (1) the baseline equivalence in smoking prevalence—in the intervention counties, compared with the comparison counties, the odds of being a smoker were 0.96 (95% confidence interval [CI] = 0.85, 1.08, $P = .47$); (2) the decline in smoking prevalence between baseline and year 5 in the intervention counties, but not in the comparison counties—the odds of being a smoker in the intervention counties at year 5 compared with baseline were 0.88 (95% CI = 0.79, 1.00, $P = .025$), whereas in the comparison counties the odds were 0.95 (95% CI = 0.85, 1.08, $P = .20$); and (3) the lower prevalence of smoking at year 5 in the intervention counties—in the intervention counties, compared with the comparison counties, the odds of being a smoker were 0.88 (95% CI = 0.78, 1.00, $P = .02$).

Smokers' Behavior

As shown in Table 2, among current smokers in both conditions, average daily cigarette consumption declined significantly since baseline but was significantly lower in year 5 in the intervention counties than in the comparison counties. The average number of serious quit attempts increased significantly in both conditions; the average longest quit attempt was significantly greater in the intervention counties in year 5 compared with

TABLE 1—Demographics and Smoking Status at Baseline

	Intervention Counties	Comparison Counties	P ^a
Age, y, mean±SE	37.8±0.23	38.6±0.23	.01
Education, %±SE			
<High school	7.8±0.51	8.1±0.50	.66
High school	38.3±0.89	38.3±0.86	.96
>High school	53.9±0.90	53.6±0.91	.77
Income, category, ^b mean±SE	2.8±0.02	2.9±0.02	.20
Married, yes, %±SE	66.9±0.90	70.4±0.84	.005
Work for pay, yes, %±SE	76.8±0.80	73.6±0.82	.005
Smoking status ^c			
Current smokers, %±SE	26.1±0.80	26.6±0.81	.66
Recent ex-smokers, %±SE	8.0±0.48	8.2±0.52	.84
Nonsmokers, %±SE	65.9±0.86	65.2±0.92	.61

^aP values are 2-tailed.

^bHousehold income was assessed in 4 categories: (1) <\$10 000, (2) \$10 000 to \$25 000, (3) >\$25 000 to <\$40 000, and (4) ≥\$40 000.

^cCurrent smokers were women who reported smoking an average of 1 cigarette per day, recent ex-smokers were ever smokers who reported having quit smoking in the past 5 years, and nonsmokers were never smokers and ever smokers who had not smoked for more than 5 years.

baseline but did not increase significantly in the comparison counties.

Quitting in the Past 5 Years and Recent Ex-Smokers' Behavior

In year 5, the quit rate in the past 5 years was significantly greater in the intervention counties than in the comparison counties. Among recent ex-smokers in the intervention counties, cigarette consumption in the last

year they smoked diminished significantly, and serious quit attempts increased compared with baseline ($P=.09$); in the comparison counties, both cigarette consumption and serious quit attempts decreased, but not significantly (Table 2).

Smokers' Attitudes

As shown in Table 2, between baseline and year 5, intention to stop smoking in the

next month and motivation to stop did not change significantly in either condition, but motivation to continue smoking diminished. The confidence scale declined significantly in both conditions but did not differ between conditions in year 5. Within the confidence scale, 3 components—confidence in quitting, controlling weight, and handling stress without smoking—decreased significantly in both conditions. The other 2 components—confidence in handling anger or handling boredom—did not change significantly in either condition (data not shown; available on request). Perceptions of social support did not differ between conditions in year 5 but had declined significantly in the comparison condition since baseline.

Smokers' Perceived Norms

Between baseline and year 5, smokers' perceptions of family norms concerning women smoking did not change significantly in either condition, whereas perceptions of friends' norms concerning women smoking were less negative in the comparison counties (Table 2). Smokers' perceptions of community norms concerning women smoking were significantly more negative in both conditions at year 5 than at baseline and were significantly more negative (i.e., even more in agreement that women should not smoke) in year 5 in the intervention counties than in the comparison counties.

TABLE 2—Smoking Behavior, Attitudes, and Perceived Norms: Cross-Sectional Surveys, Year 1 to Year 5

	Intervention Counties			Comparison Counties			
	Year 1	Year 5	P ^a	Year 1	Year 5	P ^a	P ^b
Smoking behavior							
Current smokers, %	26.1±0.8	23.8±0.8	.025	26.6±0.8	25.8±0.8	.24	.04
Cigarettes/d	19.3±0.4	17.3±0.3	<.001	20.1±0.4	18.3±0.3	<.001	.02
No. of quit attempts lasting ≥24 h	0.85±0.2	1.68±0.2	<.001	0.81±0.1	1.59±0.1	<.001	.31
Longest time quit, d	35.5±4.1	51.8±7.7	<.03	38.5±6.3	40.5±5.7	.41	.12
Ever smokers							
Quit in last 5 years, %	23.5±1.29	25.4±1.43	.16	23.5±1.31	21.4±1.37	.14	.02
Cigarettes/d before quitting	20.3±1.05	17.2±0.72	<.01	18.7±0.74	17.7±0.91	.20	.33
Attempts in year before quitting	1.88±0.14	2.55±0.48	.09	2.09±0.15	1.89±0.10	.14	.09
Smokers' smoking-related attitudes							
Intention to stop, range 1–5	2.29±0.04	2.25±0.04	.26	2.39±0.04	2.35±0.04	.24	.06
Motivation to stop, range 1–4	3.08±0.04	3.11±0.04	.26	3.18±0.03	3.15±0.04	.27	.24
Motivation to continue, range 1–4	2.83±0.03	2.75±0.04	.04	2.84±0.03	2.70±0.03	.001	.16
Confidence scale, range 1–4	2.81±0.03	2.69±0.02	<.001	2.81±0.02	2.66±0.03	<.001	.22
Social support scale, range 1–4	3.41±0.02	3.37±0.02	.09	3.41±0.02	3.35±0.02	.04	.31
Smokers' perceived norms							
Family, range 1–5	2.06±0.05	2.03±0.05	.37	2.03±0.04	2.03±0.04	.46	.45
Friends, range 1–5	2.76±0.04	2.75±0.05	.45	2.68±0.04	2.80±0.04	.02	.19
Community, range 1–5	2.34±0.05	2.09±0.04	<.001	2.39±0.04	2.26±0.04	<.01	.002

Note. All values are percentage or mean±SE.

^aP for 1-tailed test comparing year 5 with year 1 within intervention or comparison counties.

^bP for 1-tailed test comparing intervention and comparison counties in year 5.

TABLE 3—Quit Rates in the Past 5 Years, by Age, Income, Cigarette Consumption, and Length of Time Since Quitting, Reported at Year 5

	Intervention Counties	Comparison Counties	P ^a
Age, y			
18–44, % ± SE	26.0 ± 1.7	21.3 ± 1.6	.02
45–64, % ± SE	23.4 ± 2.7	21.8 ± 2.6	.34
Household income, \$			
≤25 000, % ± SE	22.6 ± 2.3	14.6 ± 2.0	<.01
>25 000, % ± SE	27.6 ± 1.9	26.4 ± 1.8	.33
Cigarette consumption			
<25 cigarettes/d, % ± SE	24.5 ± 1.6	21.4 ± 1.5	.08
≥25 cigarettes/d, % ± SE	29.7 ± 3.2	21.4 ± 3.0	.02
Time since quitting			
≥7 d, % ± SE	24.4 ± 1.4	20.4 ± 1.3	.02
≥3 mo, % ± SE	21.8 ± 1.4	18.3 ± 1.3	.03
≥6 mo, % ± SE	19.6 ± 1.3	16.8 ± 1.3	.06

^aP values are 1-tailed.

Because special efforts were made to involve lower-income women of childbearing age, we examined the relations between quitting in the past 5 years and age and income. As shown in Table 3, the quit rate among women in the intervention counties, compared with the comparison counties, was significantly greater among those aged 18 to 44 years and those with household incomes of \$25 000 or less, but it was not significantly greater among women aged 45 to 64 years or those with household incomes greater than \$25 000. The quit rate also was significantly greater among women in the intervention counties smoking 25 cigarettes or more per day but not among those smoking fewer than 25.

Among recent ex-smokers, the proportions who reported not smoking in the 7 days before the survey or in the 3 months before the survey were significantly greater in the intervention counties than in the comparison counties. The proportion who reported not smoking in the 6 months before the survey was also greater, but not significantly.

Availability of Smoking Cessation Materials and Services

In year 5, as reported by smokers and recent ex-smokers, information about smoking and booklets, pamphlets, and videotapes about smoking cessation all were significantly easier to obtain in the intervention counties than in the comparison counties. Similarly, smoking cessation classes, support groups for women who had quit, support from ex-smokers, and advice from doctors and nurses about quitting smoking were each significantly more easily available in the intervention counties than in the comparison counties (Table 4).

Program Recognition

In year 5, significantly larger proportions of smokers and recent ex-smokers in the intervention counties, compared with the comparison counties, reported the presence of an organized program for smoking cessation for women in their area. More than 80% could recall that this program was named Breathe Easy.

Media Messages

In year 5, significantly larger proportions of smokers and recent ex-smokers in the intervention counties reported hearing about smoking-related issues on the radio in the past 6 months, and significantly larger proportions of smokers reported reading about smoking-related issues in newspapers than in the comparison counties. Significantly smaller proportions of both smokers and ex-smokers in the intervention counties reported seeing smoking-related issues on television than in the comparison counties (Table 4).

Discussion

This community-based educational intervention to help women quit smoking showed consistent effects on women's smoking behavior, with a reduction in the prevalence of current smokers and an increase in the proportion of those who had quit in the past 5 years. Higher quit rates were seen among those specially targeted by the interventions—younger women and those with lower incomes. Among current smokers, a highly significant change in community norms occurred: at year 5, women smoking was perceived in the intervention counties as less acceptable than it was at baseline and in the comparison counties.

We reviewed our findings within the framework of the PRECEDE model to identify likely mechanisms for the differences observed in smoking behavior. Among the predisposing attitudinal factors, we presumed that those smokers most ready to quit did so, leaving smokers at year 5 with similar levels of motivation and intention but with less confidence. These attitudinal differences do not explain the changes in smoking behavior, because similar changes occurred in both conditions. However, among the enabling factors, skills in quitting increased in the intervention counties, as shown by smokers' quit attempts' lasting longer and ex-smokers' having made more quit attempts as reported in year 5. Changes among the reinforcing factors also were consistent with this model: smokers' perceptions of community norms concerning women smoking became more negative, and support for quitting was widely perceived as easy to obtain by both smokers and ex-smokers.

We consider that the extent to which the counties participated in developing and implementing their own annual plan objectives was an important feature of the intervention. Although the first-year plans were outlined by the investigators, second-year plans included substantially less input from them, and the third- and fourth-year plans were formulated almost entirely by the local coalitions, a process that was accompanied by an increase in each coalition's perceptions of program ownership.³⁵

This intervention was undertaken in rural counties in Vermont and New Hampshire, each with a single large town and several smaller towns. The small size and rural nature of these communities may have contributed to the achievement of the community organization strategy and to program implementation and effect. The program added resources where gaps were identified, and the resulting multifaceted program, involving support systems, health professionals, educators, worksites, and the media, provided readily accessible targeted cessation resources to potential quitters throughout both counties. In addition, the volunteers trained to provide telephone support also may have tapped into the informal communication networks among younger low-income women, encouraging and helping these women to stop smoking.^{23,36}

The organization of our project was similar, but not identical, to that of the successful Neighbors for a Smoke Free North Side project. That project had a "nuts and bolts" committee composed of project investigators and staff representing each neighborhood wellness council, which served as a resource and carried out central planning. Each neighborhood's wellness council, consisting of neighborhood

TABLE 4—Perceptions of Availability of Smoking Cessation Resources, Program Recognition, and Media Coverage of Smoking in Year 5

	Current Smokers		Recent Ex-Smokers ^a	
	Intervention Counties	Comparison Counties	Intervention Counties	Comparison Counties
Availability of (mean \pm SE)				
Information about smoking ^b	3.65 \pm 0.03	3.47 \pm 0.03***	3.68 \pm 0.04	3.41 \pm 0.06***
Booklets/pamphlets about smoking cessation	3.68 \pm 0.03	3.53 \pm 0.03***	3.66 \pm 0.04	3.46 \pm 0.05 [†]
Videotapes about smoking cessation	2.87 \pm 0.05	2.52 \pm 0.05***	2.85 \pm 0.08	2.64 \pm 0.08*
Smoking cessation classes	3.40 \pm 0.03	2.99 \pm 0.04***	3.50 \pm 0.06	3.11 \pm 0.06***
Support groups for women who had quit	3.22 \pm 0.04	2.73 \pm 0.04***	3.27 \pm 0.07	2.87 \pm 0.08***
Support from ex-smokers	3.07 \pm 0.04	2.59 \pm 0.04***	3.16 \pm 0.08	2.68 \pm 0.09***
Advice from doctors and nurses	3.78 \pm 0.02	3.66 \pm 0.02***	3.84 \pm 0.03	3.71 \pm 0.04***
Advice from other professionals	3.45 \pm 0.03	3.35 \pm 0.03***	3.55 \pm 0.05	3.50 \pm 0.05
Program recognition and media coverage (% \pm SE)				
Organized cessation program for women, % yes	67.5 \pm 1.7	22.0 \pm 1.4***	69.1 \pm 3.1	18.2 \pm 2.6***
Could name program Breathe Easy, %	82.3 \pm 2.2	1.2 \pm 1.2***	85.8 \pm 3.1	4.8 \pm 4.7***
Media messages about smoking on television, % yes	71.0 \pm 1.8	76.3 \pm 1.5***	67.4 \pm 3.0	76.9 \pm 3.0**
Media messages about smoking on radio, % yes	70.6 \pm 1.7	52.7 \pm 1.9***	75.7 \pm 2.8	61.4 \pm 3.4***
Media messages about smoking in newsprint, % yes	67.7 \pm 1.8	56.5 \pm 1.7***	75.3 \pm 3.0	69.1 \pm 3.2

^aRecent ex-smokers were ever smokers who reported quitting in past 5 years.

* $P = .03$; ** $P = .01$; *** $P < .001$; [†] $P < .002$ (P values are 1-tailed).

^bResponses to each of these items were on a 4-point measure: 1 = probably not available, 2 = not easy to get, 3 = somewhat easy to get, 4 = very easy to get.

volunteers and a paid staff member, approved plans and organized and directed program activities. A citywide advisory council provided linkages to key individuals in the community and gave advice about implementation.¹¹

In contrast, each COMMIT study site, as part of the contractual relationship with its funding agency, was required to accomplish a set of objectives specified by the national planning group rather than set its own, although there was some flexibility to accommodate local variations.²⁷ In addition, as part of the COMMIT study's intervention strategy, smoking cessation resources were expected to increase within the intervention communities in response to increased demand rather than to be developed as part of each community's program.³⁷

The major limitations to this study were the nonrandomized design, the inclusion of only 2 counties in each condition, and the lack of prior measures of smoking prevalence in these counties to assess earlier secular trends. The rural nature of the counties and lack of ethnic diversity in the study population limit the generalizability of the results. Although smoking behavior was based on self-report, population surveys are generally valid in situations such as ours, in which no

connection was obvious between the survey and intervention activities.³⁸⁻⁴⁰

The study's strengths were having adequate power to test the major hypothesis, a difference in smoking prevalence; the use of the same unit of analysis as of allocation, the 4 counties; and the baseline comparability of the matched counties, especially in relation to smoking status, education, and income. The changes in smoking behavior, including prevalence, cigarette consumption, quit attempts, and quit rates, were internally consistent, and the norm change and perceived ease of access to support for quitting smoking also were consistent with program theory and content. We note that the greater quit rates among lower-income and younger women argue against the likelihood that secular trends account for the results.

We conclude that in these rural counties, community participation in planning and implementing interventions that modeled smoking behavior change and provided widespread local support to help women stop smoking were accompanied by favorable changes in women's smoking behavior. We suggest that future community interventions designed to effect reductions in smoking should place greater emphasis on the

provision of a broad range of support for quitting smoking that is readily accessible to all smokers. □

Contributors

R. H. Secker-Walker contributed to the design and implementation of the project, the analytic approach, and interpretation of results. He wrote the first draft of the paper and incorporated subsequent revisions. B. S. Flynn had major responsibility for the conceptual approach and evaluation of the project and for interpretation of results and contributed to the writing of the paper. L. J. Solomon also had major responsibility for the conceptual approach, for many facets of the intervention, and for interpretation of the results and contributed to the writing of the paper. J. M. Skelly undertook the statistical analyses and preparation of tables and contributed to the writing of the paper. A. L. Dorwaldt contributed to the design and especially to the implementation of the intervention, to the interpretation of results, and to revisions of the paper. T. Ashikaga provided statistical guidance, directed the data analyses, and contributed to the writing of the paper.

Acknowledgments

This study was supported by National Institutes of Health grants HL40685 and CA22435.

This study was approved by the University of Vermont's institutional review board. Verbal consent to participate in the telephone interviews was obtained at the start of the interview.

We are most grateful to Nancy Lanoue, Susan Thielen, Sally Christ, Marlene Meir, Marilyn Riley, Nancy Snider, Julie Sperling, Susan Martell, and Jane Farina, who staffed and ran the Breathe Easy offices, for their skill, enthusiasm, and hard work during the course of this project. We thank Robert Tortolani, MD, and John Walters, MD, for their leadership and active support of the project. We also much appreciated Neil Bracht's advice and encouragement during the early years of this project.

The conduct of this project was also made possible through the collaborative support of other members of the research team: Berta M. Geller, EdD, John K. Worden, PhD, Pamela M. Vacek, PhD, Chintamani J. Rairikar, MS, Catherine M. Lloyd, MA, Greg S. Dana, BA, Dawn Pelkey, and Barbara Branch.

References

1. Puska P, Nissinen A, Tuomilehto J, et al. The community-based strategy to prevent coronary heart disease: conclusions from the ten years of the North Karelia Project. *Annu Rev Public Health*. 1985;6:147-193.
2. Maccoby N, Farquhar JW, Wood PD, Alexander J. Reducing the risk of cardiovascular disease: effects of a community-based campaign on knowledge and behavior. *J Community Health*. 1977;3:100-114.
3. Gutzwiller F, Nater B, Martin J. Community-based primary prevention of cardiovascular disease in Switzerland: methods and results of the National Research Program (NRP 1A). *Prev Med*. 1985;14:482-491.
4. Fortmann SP, Taylor CB, Flora JA, Jatulis D. Changes in adult cigarette smoking prevalence after 5 years of community health education: the Stanford Five-City Project. *Am J Epidemiol*. 1993;137:82-96.
5. Lando HA, Pechacek TF, Pirie PL, et al. Changes in adult cigarette smoking in the Minnesota Heart Health Program. *Am J Public Health*. 1995;85:201-208.
6. Carleton RA, Lasater TM, Assaf AR, et al. The Pawtucket Heart Health Program: community changes in cardiovascular risk factors and projected disease risk. *Am J Public Health*. 1995;85:777-785.
7. Goodman RM, Wheeler FC, Lee PR. Evaluation of the Heart to Heart Project: lessons from a community-based chronic disease prevention project. *Am J Health Promot*. 1995;9:443-455.
8. Egger G, Fitzgerald W, Frape G, et al. Results of large scale media antismoking campaign in Australia: North Coast "Quit for Life" programme. *BMJ*. 1983;287:1125-1128.
9. COMMIT Research Group. Community Intervention Trial for Smoking Cessation (COMMIT), II: changes in adult cigarette smoking prevalence. *Am J Public Health*. 1995;85:193-200.
10. COMMIT Research Group. Community Intervention Trial for Smoking Cessation (COMMIT), I: cohort results from a four-year community intervention. *Am J Public Health*. 1995;85:183-192.
11. Fisher EB, Auslander WF, Munro JF, Arfken CL, Brownson RC, Owens NW. Neighbors for a Smoke Free North Side: evaluation of a community organization approach to promoting smoking cessation among African Americans. *Am J Public Health*. 1998;88:1658-1663.
12. *Reducing the Health Consequences of Smoking: 25 Years of Progress. A Report of the Surgeon General*. Atlanta, Ga: Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; 1989:259-378. DHHS publication CDC 89-8411.
13. Solomon LJ, Flynn BS. Women who smoke. In Orleans CT, Slade J, eds. *Nicotine Addiction: Principles and Management*. New York, NY: Oxford University Press Inc; 1993:339-349.
14. Secker-Walker RH, Flynn BS, Solomon LJ, et al. Helping women quit smoking: baseline observations for a community health education program. *Am J Prev Med*. 1996;12:367-377.
15. Bracht N, Gleason J. Strategies and structures for citizen partnerships. In: Bracht N, ed. *Health Promotion at the Community Level*. Newbury Park, Calif: Sage Publications; 1990:109-124.
16. Green LW. The theory of participation: a quantitative analysis of its expression in national and international health policies. In: Patton RD, Cissell WB, eds. *Community Organization: Traditional Principles and Modern Applications*. Johnson City, Tenn: Latchpins Press; 1990:48-63.
17. Thompson B, Wallack L, Lichtenstein E, Pechacek T. Principles of community organization and partnership for smoking cessation in the Community Intervention Trial for Smoking Cessation (COMMIT). *Int Q Community Health Educ*. 1990-1991;11:187-203.
18. Bandura A. *Social Learning Theory*. Englewood Cliffs, NJ: Prentice-Hall Inc; 1977.
19. Prochaska JO, DiClemente CC. Stages and processes of self-change of smoking: toward an integrative model of change. *J Consult Clin Psychol*. 1983;51:390-395.
20. Rogers EM. *Diffusion of Innovations*. 3rd ed. New York, NY: Free Press; 1983.
21. McGuire WJ. Persuasion, resistance and attitude change. In: DeSola I, Schram W, eds. *Handbook of Communication*. Chicago, Ill: Rand-McNally; 1973:216-252.
22. Green LW, Kreuter MW. *Health Promotion: An Educational and Environmental Approach*. Mountain View, Calif: Mayfield Publishing Co; 1991.
23. Solomon LJ, Secker-Walker RH, Flynn BS, Christ S, Dana GS, Dorwaldt AL. Proactive peer support by telephone to help women quit smoking. *Health Educ Res Theory Pract*. 1996;11:377-381.
24. Geller BM, Worden JK, Solomon LJ, et al. *Choosing Not to Smoke* [videotape]. Burlington: Office of Health Promotion Research, University of Vermont; 1991.
25. Secker-Walker RH, Solomon LJ, Geller BM, et al. Modeling smoking cessation: exploring the use of a videotape to help pregnant women quit smoking. *Women Health*. 1997;25:23-35.
26. Secker-Walker RH, Dana G, Solomon LJ, Flynn BS, Geller BM. The role of health professionals in a community-based program to help women quit smoking. *Prev Med*. 2000;30:126-137.
27. COMMIT Research Group. Community Intervention Trial for Smoking Cessation (COMMIT): summary of design and intervention. *J Natl Cancer Inst*. 1991;83:1620-1628.
28. Russell M, Wilson C, Taylor C, Baker C. Effect of general practitioners' advice against smoking. *BMJ*. 1979;2:231-235.
29. Waksberg J. Sampling methods for random digit dialing. *J Am Stat Assoc*. 1978;73(361):40-46.
30. *Ci2 System* [computer program]. Version 2. Ketchum, Idaho: Sawtooth Software Inc; 1986.
31. Groves RM, Lyberg LE. An overview of non-response issues in telephone surveys. In: Groves RM, Biemer PB, Lyberg LE, Massey JT, Nicholls WL, Waksberg J, eds. *Telephone Survey Methodology*. New York, NY: John Wiley & Sons Inc; 1988:191-211.
32. *SAS Language and Procedures: Usage* [computer program]. Version 6. Cary, NC: SAS Institute Inc; 1989.
33. Shah BV, Barnwell BG, Bieler GS. *SUDAAN User's Manual*. Release 7.5. Research Triangle Park, NC: Research Triangle Institute; 1997.
34. Kish L. *Survey Sampling*. New York, NY: John Wiley & Sons Inc; 1965.
35. Flynn BS. Measuring community leaders' perceived ownership of health education programs: initial tests of reliability and validity. *Health Educ Res Theory Pract*. 1995;10:27-36.
36. Fisher EB, Auslander W, Sussman L, Owens N, Jackson-Thompson J. Community organization and health promotion in minority neighborhoods. *Ethn Dis*. 1992;2:252-272.
37. Lichtenstein E, Pomrehn PR, Sciandra RC. Activities to enhance the use of cessation resources in COMMIT. In: Shopland DR, Thompson B, Burns DM, Lynn WR, eds. *Community-Based Interventions for Smokers: The COMMIT Field Experience*. Bethesda, Md: National Cancer Institute; 1995:121-131. NIH publication 95-4028. Smoking and Tobacco Control, Monograph 6.
38. Velicer W, Prochaska J, Rossi J, Snow M. Assessing outcome in smoking cessation studies. *Psychol Bull*. 1992;111:23-41.
39. Dwyer T, Pierce JP, Hannam C, Burke N. Evaluation of the Sydney "Quit for Life" anti-smoking campaign. *Med J Aust*. 1986;144:344-347.
40. Patrick DL, Cheadle A, Thompson DC, Diehr P, Koepsell T, Kine S. The validity of self-reported smoking: a review and meta-analysis. *Am J Public Health*. 1994;84:1086-1093.